

Work Order ID 135863

135863

Page 1

Monday, August 24, 2015 1:29:57 PM

Item ID: D407-667-205 REPAIR

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube - High 407

Start Date: 8/21/2015 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 8/24/2015 Req'd Qty: 1.00 *1*

Customer: CEDWA01

Reference: RMA RA112134

Approvals: Process Plan: MF Date: 15-8-24

Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
100	

0.00

0.00

100

QC

Quality Control

Memo

INSPECT RA112134

D407-667-205 X1 B108703

TRW 8164821

CROSTUBE WAS REMOVE FROM AIRCRAFT n401gc WITH 584 HOURS
AND 6043 landings

Inspection findings:

-corrosion found on D2894-1, D3190-1, MS21920-22 & Ms21920-25

-damage on D3190-1

-chaffing shield is installed as per rev F

-crosstube has been repainted by customer

REWORK D407-667-205 as per RS1028

ID AND STOCK UNDER d407-667-205 USED @ CHG 009

Safe Attached

MCS 15-11-17

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION		AGAINST DEPARTMENT/PROCESS							
	Rework	☐	Skid-tube	☐	Cross tube	☐	Water Jet	☐	Engineering	☐
	Scrap	☐	Machining	☐	Small Fab	☐	Prod. Eng. Coord.	☐	Quality	☐
	Use-as-is	☐	Thermoforming	☐	Finishing	☐	Rec/Store/Packaging	☐	Other	☐
	Suspected Unapproved	☐	Large Fab	☐	Composite	☐	Supplier	☐		

Date : _____ Step #: _____ QTY Effective : _____ MRB (QS1042) Approval

Description Work Order Deviation	Disposition	Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval

Root Cause				FAULT CATEGORY							
Environment	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐	Power Loss/Surge	☐	Positioned Wrong	☐
Design	☐	Operator	☐	Bending	☐	Set-up	☐	Folio/Program	☐	Outside Dimensions	☐
Doc/Data	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐	Grain	☐	Over/Under tolerance	☐
Equip/Tooling	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐	Weld	☐	Part Incorrect	☐
Handling/Pre	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐	Wrong Stock Pulled	☐	Part Lost/Missing	☐
Material	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐	Out of Sequence	☐	Part Moved	☐
Internal Transport	☐	Poor Information	☐	Crushing	☐	Countersink	☐	Off-set	☐	Drawing	☐
Tribal Knowledge	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐	Mislabeled	☐	Finish	☐
LOA	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐	Fit/Function	☐	Misread	☐
Substation	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐	Misaligned/off center	☐	Turning Sequence	☐
Past Expiry Date	☐	Manufacturing Process	☐								
Misidentified	☐	Past Due	☐	OTHER :							

Work Order ID 135863

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135863

Page 2

Item ID: D407-667-205 REPAIR Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Aft Crosstube - High 407
 Start Date: 8/21/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 8/24/2015 Req'd Qty: 1.00 ***1*** Customer: CEDWA01
 Reference: RMA RA112134

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
110	<i>QCS</i>	0.00				1			DAS 41 9-89
110									15-11-16
Crosstubes	Memo	0.00							DAS 38 9-89
Crosstubes									NOV 16 2015
115	<i>QCS inspect crosstube (rework)</i>								
120	Identify as per dwg & Stock Location: <i>697</i>	0.00							
120									
Packaging	Memo	0.00							
Packaging									
130	QC21- Final Inspection - Work Order Release	0.00							
130									
QC	Memo	0.00							
Quality Control									

** CRACK in corner*

SW
 20151130

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%; border: none;"> <tr> <td style="border: none;">Skid-tube ☐</td> <td style="border: none;">Cross tube ☐</td> <td style="border: none;">Water Jet ☐</td> <td style="border: none;">Engineering ☐</td> </tr> <tr> <td style="border: none;">Machining ☐</td> <td style="border: none;">Small Fab ☐</td> <td style="border: none;">Prod. Eng. Coord. ☐</td> <td style="border: none;">Quality ☐</td> </tr> <tr> <td style="border: none;">Thermoforming ☐</td> <td style="border: none;">Finishing ☐</td> <td style="border: none;">Rec/Store/Packaging ☐</td> <td style="border: none;">Other ☐</td> </tr> <tr> <td style="border: none;">Large Fab ☐</td> <td style="border: none;">Composite ☐</td> <td style="border: none;">Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																	
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Picklist Print

Monday, August 24, 2015 1:29:54 PM

Page 1

Work Order ID: 135863

135863

Parent Item: D407-667-205 REPAIR

D407-667-205 REPAIR

Parent Item Name: Aft Crosstube - High 407

Start Date: 8/21/2015

Required Date: 8/24/2015

Start Qty: 1.00

Required Qty: 1.00

Comments:

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205 REPAIR		Manufactured	No				Each	0.0000		1			
D407-667-205 REPAIR									**				

Aft Crosstube - High 407

1 x 108703 umf

15-08-24

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					

Root Cause				FAULT CATEGORY			
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐		
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐		
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐		
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Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____					
Misidentified ☐	Past Due ☐						

RA112134

Received @ August 19, 2015
Inspected @ August 20, 2015

CUSTOMER: BELL CHERON
CUSTOMER CONTACT: ALAIN LOUPE
SHIPPED FROM: PINEY FLATS, TENNESSEE USA

Instructions for RA112134 D407-667-205 B108703 CHG 008

- D407-667-205 was sent for repair
- Crosstube was removed from aircraft N401GC with 584 hours and 6043 landings
- Inspection findings
 - Corrosion found on D2894-1, D3190-1, MS21920-22 and MS21920-25
 - Damage on D3190-1
 - Chaffing shield is install as per rev f
 - Crosstube has been repainted by customer
- Re work D407-667-205 as per RS1028
- Stock under used D407-667-205 at CHG 009

Instructions for RA112134 D407-667-205 B108433 CHG 008

- Not received

Time Estimate: Min 60 hours

Departments Required: quality, crosstube, finishing

Pictures Attached: yes

QTY INSPECTED: D407-667-205 B108703 CHG 008

**THIS INSTRUCTION SHEET MUST
BE ATTACHED TO THE
RESTOCKING WORK ORDER AT
ALL TIMES!!!!**

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐							
Date :		Step #:		QTY Effective :				MRB (QSI042) Approval			
Description Work Order Deviation				Disposition				Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval			
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐		No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐		FAULT CATEGORY Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐		Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐		Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐	
OTHER : ☐											

DART AEROSPACE LTD	Work Order:	
Description: Corrosion in center of cross tube		
Drawing: D407-667-245	Repair Scheme:	RS1028
Part No: D407-667-205 Aft Crosstube	Page:	1 of 2
Batch No: B _____	Qty:	1

Step	Location	Procedure	By	Date	Qty
1	Quality Assurance	Inspect Condition of RA 112134 D407-667-205 B108703 ALL WORK TO BE CARRIED OUT AS PER ICA - Removed from N401GC - Original removal tag attached to work order - D407-667-205 will be rework as per ICA-D206-667-1 Check the following POOR / USED ☒ DAMAGED / USED ☒ CORRODED / USED ☒ NEW ☐	DAS 9 9-89 1503-24	①	
2	Finishing / Crosstube assembly	Remove the following hardware from tube - D2894-1 Support B103152 clean off all Scotch-Weld & clean support entirely and tag to be reinstalled on the cross tube - Discard all MS21920-25 M _____ x2 & D3595-063-450 B _____ x2 - MS21920-22 M _____ x4 and discard - Remove D3190-1 B _____ x2 and Discard		DAS 41 9-89	
3	Finishing / Crosstube assembly	Strip paint and primer. P/O: 29714	CX	SEP 08 2015	1
4	QC 15 Quality Control	Measure all dimensions as per DWG / ICA & fill out on the crosstube dimension sheet	S	15/09/18	
5	Landing Gear / Crosstube	<u>BUFF OUT ALL CORROSION AND MARKS WITHIN ACCEPTABLE LIMITS AS INSTRUCTED IN THE ICA</u>	NTW	15-09-24	
6	Landing Gear / Crosstube	Perform ultrasonic measurements in the locations from the original work order D407-667-205TRN B _____ and at location where corrosion was found Fill out wall thickness measurement FAI	NTW	15-09-24	
7	QC 5 Quality Control	Inspect work to current step	DAS 9 9-89	15-09-25	
8	Finishing	Alodine as per QSI005 4.1	NTW	15-09-24	
9	QC 7 Quality Control	Inspect alodine finish as per QSI 005 & QSI 012	DAS 9 9-89	15-09-25	
10	Finishing / Crosstube Assembly	Prime as Per QSI 005 4.2 Tempo 4500-PB-23Y-BG B# 132384 Exp. Date # 8/16 Clear 132664 Paint 132896	DAS 41 9-89	15-10-13	1
11	QC 14 Quality Control	Inspect finish of tube	DAS 38 9-89	NOV 16 2015	1

b22343
FS = 892.1
L' 536°
539°

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation			Disposition		
			Completed By		
			Lead hand / Supervisor Approval Verification		
			QC / QA Coordinator Approval		
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐			FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐		
OTHER : ☐					

DART AEROSPACE LTD	Work Order:	
Description: Corrosion in center of cross tube		
Drawing: D407-667-245	Repair Scheme:	RS1028
Part No: D407-667-205 Aft Crosstube	Page:	2 of 2
Batch No: B	Qty:	1

12	Finishing / Crosstube assembly	Reinstall as per DWG Install Chafing Shield as per D407-667-245 rev G. Ensure that the overlapping edge of the chafing shield is located at approximately 60° from bottom vertical to prevent deterioration of the rubber bumpers. Be sure to eliminate any air gaps. D3190-1-x2 B# <u>137155</u> MS21920-22-x4 M# <u>133483</u> A/R Proseal 890 B# <u>133071</u> Exp.: <u>2/16</u> Lightly Scuff the bonded are using 320 grit sand paper and clean area with 41058 was 'n' wipe. Install original D2894-1 using Scotch-Weld DP460 and install clamps as per DEO D407-667-245 using installation jig DT9025. Torque clamps as per Dwg A/R Scotch-Weld DP460 B# <u>132895</u> Exp.: <u>2/16</u> MS21920-25-x2 M# <u>133336</u> D3595-063-450-x2 B# <u>136574</u>	DAS 41 9-89	15-11-11	1
13	QC 5 Quality Control	Re-inspect locations for Installed hardware as per Dwg Re-inspect Torque of clamps to 80-100 IN-LB	DAS 38 9-89	NOV 16 2015	1
14	Stores / Packaging	Pick kit AN5-10A= M# <u>133077</u> x10-3 AN5-34A= M# <u>133363</u> x4-2 ✓ AN5-32A= M# <u>132536</u> x4-2 ✓ MS21042L5: M# <u>132677</u> x4-2 in stock NAS1149D0563J: M# <u>132677</u> x18-6 in stock <u>15-11-13</u> Had in new paper work And new label with identification as USED/REPAIR part	 DAS 26 9-89 DAS 28 9-89	NOV 17 2015	1
15	QC 4 Quality Control	Inspect Kit for completeness and ensure labels are correct	DAS 28 9-89	NOV 17 2015	1
16	Packaging	Identify & Stock as USED			
17	Quality Control	QC21	HLJ	NOV 30 2015	

Rev	Date	Change Description	Prepared	Checked	Approved
B	15.07.24	New Issue	PD		

U:\Admin\Forms\Repairschemb\A.doc

Rev. B

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

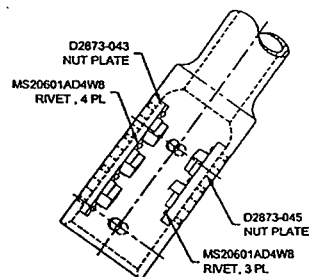
Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%; border: none;"> <tr> <td style="border: none;">Skid-tube ☐</td> <td style="border: none;">Cross tube ☐</td> <td style="border: none;">Water Jet ☐</td> <td style="border: none;">Engineering ☐</td> </tr> <tr> <td style="border: none;">Machining ☐</td> <td style="border: none;">Small Fab ☐</td> <td style="border: none;">Prod. Eng. Coord. ☐</td> <td style="border: none;">Quality ☐</td> </tr> <tr> <td style="border: none;">Thermoforming ☐</td> <td style="border: none;">Finishing ☐</td> <td style="border: none;">Rec/Store/Packaging ☐</td> <td style="border: none;">Other ☐</td> </tr> <tr> <td style="border: none;">Large Fab ☐</td> <td style="border: none;">Composite ☐</td> <td style="border: none;">Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																
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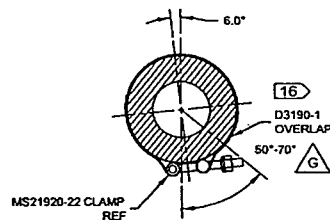
REFERENCE ONLY

D407-667-605

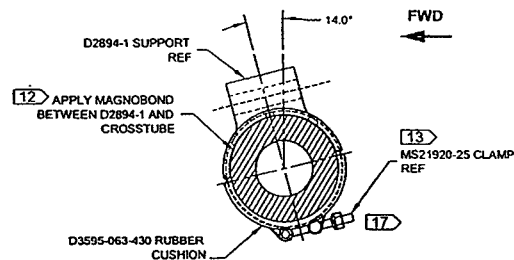
**D407-667-245
ASSEMBLY DETAIL
(VIEW LOOKING FWD)**



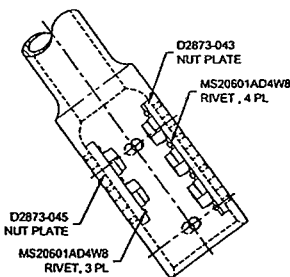
**VIEW A-A CUFF DETAIL
SCALE 4X**



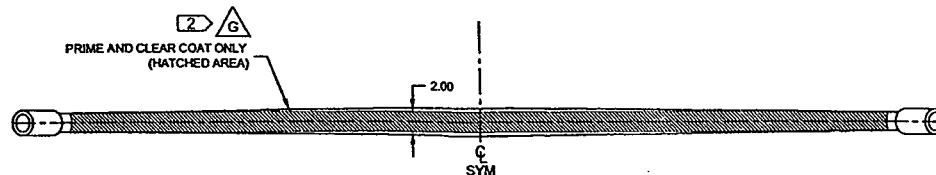
**SECTION B-B
SCALE 4X, 2PL**



**SECTION C-C
SCALE 4X**



**VIEW D-D CUFF DETAIL
SCALE 4X**



RELEASED
2015 APR 09

DESIGN	Q	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. G
MFG. APPR.	Q	D407-667-245	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	15.03.20	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR DISSEMINATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

Location	Before dimension	After dimension	Accept	Reject	Method of inspection
----------	------------------	-----------------	--------	--------	----------------------

A	0.495"	0.485			blade mic <i>ultra</i>
B	2.450"	2.426			blade mic
B	0.660	0.593			ultra sound
	2.658	2.633			ultra sound <i>Blade</i>
C	0.559	0.557			ultra sound
	2.541	2.515			ultra sound <i>Blade</i>
D	0.642	0.622			blade mic <i>ultra</i>
E	2.749	2.729			blade mic
E	0.615	0.624			ultra sound
	2.749	2.725			ultra sound <i>Blade</i>
F	0.665	0.666			ultra sound <i>Blade ULTRA</i>
	2.749	2.741			ultra sound <i>Blade</i>
G	0.554	0.551			blade mic <i>ultra</i>
H	2.548	2.555			blade mic
H	0.435	0.436			ultra sound
	2.357	2.383			ultra sound <i>Blade</i>
I	0.538	0.507			ultra sound
	2.464	2.459			ultra sound <i>Blade</i>

measured by:
date:

inspected by:
date:



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO29714**

Purchase Order Date 9/8/2015

PO Print Date 9/8/2015

Page Number 1 of 2

Order From :

VC-IMI001

Ship To : DART AEROSPACE LTD

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

IMI MANUFACTURING INC.
772 MAIN ST. E.P.O. BOX 3
HAWKESBURY, ON K6A 2R4
CA

PAID

Contact Name

Vendor Phone

613 675 1208 Ext.223

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

CAD

FOB

Destination-Collect

Ship To Contact

Ship To Phone

Ship Via:

Ship Acct:

Line Nbr	Reference Vendor Part Number Line Comments Delivery Comments	Description/ Mfg ID	Req Date/ Taxable Promise Date	CD	Req Qty/ Unit of Measure	PO Unit Price	Extended Price
1	135115	D407-667-205 CROSSTUBE	9/11/2015 Yes 9/11/2015 To cover the cost of pain stripping. Strip product supplied.		1.00	\$0.00	\$0.00
Line Total:							\$0.00
2	135863	D407-667-205 CROSSTUBE	9/11/2015 Yes 9/11/2015 To cover the cost of pain stripping. Strip product supplied.		1.00 <i>15/9/17</i> <i>SV</i>	\$0.00	\$0.00
Line Total:							\$0.00

PO Instructions: PROCUREMENT QUALITY CLAUSES
A000 CLAUSES NOT REQUIRED

Note:

9/8/2015



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO29714**

Purchase Order Date 9/8/2015
PO Print Date 9/8/2015

Page Number 2 of 2

Order From :

IMI MANUFACTURING INC.
772 MAIN ST. E.P.O. BOX 3
HAWKESBURY, ON K6A 2R4
CA

VC-IMI001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone

613 675 1208 Ext.223

Buyer

Customer POID

Customer Tax #

Terms

Currency

FOB

Chantal Lavoie

10127-2607

Net 30

CAD

Destination-Collect

Ship To Contact

Ship To Phone

Ship Via:

Ship Acct:

3 136053

D407-667-205
CROSSTUBE

9/11/2015

Yes

9/11/2015

1.00

\$0.00

\$0.00

To cover the cost of pain stripping.
Strip product supplied.

Line Total:

\$0.00

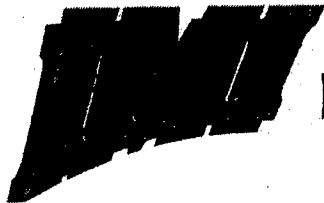
PO Total:

\$0.00

PO Instructions: PROCUREMENT QUALITY CLAUSES
A000 CLAUSES NOT REQUIRED

Note: Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Change Date: 9/8/2015



Manufacturing Inc.

2056 County Rd #4, L'Original, Ontario K0b 1K0

Phone 613-675-1208

Fax 613-675-1250

PACKING SLIP

Date : Sept 17 /2015

TO : DART AEROSPACE
1270 Aberdeen Street
Hawkesbury ON
K6A 1K7

SALESPERSON:		JOB #	PO NUMBER :	
		15-0383-22	29714	
QTY ORDER	DESCRIPTION		QTY SHIP	LINE TOTAL
1	Decaper tuyaux (CROSSTUBE) <i>15/9/17 SP</i>		1	

Client: (PRINT NAME) _____ (SIGNATURE) _____

THANK YOU FOR YOUR BUSINESS!

Work Order ID 108703

October-29-13 8:37:55 AM

108703

Page 1

Item ID: D407-667-205

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: MLJ Date: 13-10-29 Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D407-667-245	Rev F/DEO

100	DOCUMENT CONTROL	0.00							
100									
DC	Memo	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D407-667-205 CHG008								

DAS
6 13/11/20
9-89

13-11-21
BG

110	Pick Kit	0.00							
110	Packaging								

Packaging	Memo	0.00							
-----------	------	------	--	--	--	--	--	--	--

Packaging

13-10-30
JG
TL

120	BENDING MACHINE - CROSSTUBES	0.00							
120									

CNC Bend 1	Memo	0.00							
------------	------	------	--	--	--	--	--	--	--

CNC Delta 100 Bender
1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21

13-10-30
JG
TL

Work Order ID 108703

October-29-13 8:37:55 AM

108703

Page 2

Item ID: D407-667-205

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
130									
QC	Memo	0.00							
Quality Control									

DAS
16
9-89 13/10/31

Work Order ID 108703

October-29-13 8:37:55 AM

108703

Page 3

Item ID: D407-667-205

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	Crosstubes	0.00							
140									
Crosstubes									
Crosstubes	Memo ***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING***** , VERIFIED BY: <u>MO</u> ***** 1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes. Holes facing inboard. Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245 ***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING***** , VERIFIED BY: <u>MO</u> ***** 2- Drill fwd rivet holes using drill Jig DT8787 fwd as per Dwg D407-667-245. Note: FWD side has 3X top holes facing inboard. 3- C'sink holes as per dwg D407-667-245. Allow rivet to sit below surface to compensate for paint. 4- Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins. Drill ONLY 2 top holes ONLY plug most bottom hole to prevent accidental drilling. Drill holes and ream using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes. Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245 ***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING***** , VERIFIED BY: <u>MO</u> ***** 5-Drill aft rivet holes using drill Jig DT8787 aft as per Dwg D407-667-245.	0.00							

MO / 13/11/24

Work Order ID 108703

October-29-13 8:37:55 AM

108703

Page 4

Item ID: D407-667-205

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

NR1

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Drill only the top (2) holes.

***** ENSURE PROPER JIG POSITIONING BEFORE DRILLING*****
VERIFIED BY: MO *****

6- C'sink holes as per dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

7- Scribe tube to identify on the inner chamfer in the cuff D# and B#

8-*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***Debur
& Inspect for surface damage. Repair damage within limits as per Dwg D407-667-245

MO 13/11/04
STW

KE 13-11-06.

SHN
1311.07

150

QC5- Inspect part completeness to step on W/O 0.00

150

QC

Memo 0.00

Quality Control

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

Work Order ID 108703

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108703

Page 5

Item ID: D407-667-205

Accept

N9000040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160		0.00							
160									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- CLEAN CROSSTUBE WITH WASH'N WIPE								
180		0.00							
180									
Outsource2	Memo	0.00							
Outsource process - NDT	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Liquid Penetrant Inspection as per QSI 0380								
	Issue P/O: 21977 LPI as per ASTM 1417								
	Level 2 Attach copy of NDT results to work order								
190		0.00							
190									
Packaging	Memo	0.00							
Packaging	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Ensure copy of NDT results attached to work order.								

13-11-7

CL 13/11/08 @

13/11/08 (U)

Work Order ID 108703

October-29-13 8:37:55 AM

108703

Page 6

Item ID: D407-667-205

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	QC5- Inspect part completeness to step on W/O	0.00							
200									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
204		0.00							
204									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION								
206	QC7-Inspect Chemical Conversion Coat	0.00							
206									
QC	Memo	0.00							
Quality Control	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								

Work Order ID 108703

108703

Page 7

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Item ID: D407-667-205

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
210									
SprayPaint	Memo	0.00							
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								
	Mask underside of crosstube as shown								
	1-Prime inside and outside crosstube as per DEO D407-667-245 and QSI 005 4.2								
	2-Paint outside crosstube with White Imron as per QSI 005 4.2								
	PRIME: 126873								
	Start Time: 9:45								
	Finish Time: 10:15								
	clear: 126556								
	PAINT: 127155								
	Start Time: 7:15								
	Finish Time: 8:00								
220	QC14- Inspect Spray Paint	0.00							
220									
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

13-11-13

Work Order ID 108703

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108703

Page 8

Item ID: D407-667-205

Accept

N900040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

NR1

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00							
230	Crosstubes					<u>1</u>	<u>0</u>	<u>0</u>	<u>13-11-18</u>
Crosstubes	Memo	0.00							
Crosstubes	1- Install chafing shield as per DEO D407-667-245. Top holes should be facing up. A/R Proscal 890 Batch: <u>126855</u> EXP: <u>5/14</u>								
	2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe								
	3- Install support with Scotch-Weld DP460 and install clamps as per DEO Dwg D407-667-245 using installation jig DT9025. Torque clamps as per dwg A/R Scotch-Weld DP460 Batch: <u>126328</u> EXP: <u>7/14</u>								
	LET CURE FOR 24 HOURS CURE TIME: START: <u>9:45</u> FINISH: <u>11:00</u>								
	4- Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.								

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Item ID: D407-667-205

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Aft Crosstube

Start Date: 10/29/13 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240 *240* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo ***RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURE FOR 24HOURS AS PER DWG DEO***	0.00 0.00				1			DAS 05 13-11-21
250 *250* Packaging Packaging	Pick Kit Memo	0.00 0.00				X			13-11-21 DAS 26 9-89
260 *260* QC Quality Control	QC4- 100% Inspect kits for completeness Memo	0.00 0.00							DAS 6 13/11/22 89

Work Order ID 108703

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108703

Page 10

Item ID: D407-667-205

Accept

N900040100Setup Start ***NS1***

Revision ID:

Item Name: Aft Crosstube

Stop ***NS2***

Start Date: 10/29/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/12/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

270

0.00

270

Packaging

Packaging

Memo

0.00

Packaging

Identify and in kanban rack

Location: 13

1 8 13-11-25
DPS
6
999

280

0.00

280

QC21- Final Inspection - Work Order Release

QC

Memo

0.00

Quality Control

13/11/27 DJ

13-11-26

Picklist Print

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Page 1

Work Order ID: 108703

108703

Parent Item: D407-667-205

D407-667-205

Parent Item Name: Aft Crosstube

Start Date: 10/29/13

Required Date: 11/12/13

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:C 05.09.02 Add holes for compatibility with Bell SkidtubesKJ/JLM
IPP Rev:D Added Magnobond,Rubber Cushion & Clamps 07-02-19
JLM

****CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER****

IPP Rev:E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified by:EC

IPP Rev:F 08-06-12 add comment in seq. 24 DD verified by:EC

IPP Rev:G 08-08-19 revE as per dwg DD verified by:EC

IPP Rev:H 09.01.06 ECN 08-562 EC verified by:DD IPP Rev:I

10.04.07 revise route seq. in bom DD verified by:JLM IPP Rev J 11.04.26
removed abrasion strip ecn 11-551 EC verified

by:DD

IPP REV:K

11.10.03 DEO D407-667-245-F-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205TRN		Manufactured	No			110	Each	5.0000	1	1			

D407-667-205TRN

Crosstube Turning Detail

**

Location

Loc Qty

Loc Code

LG

2

104820

1

104821

1

LG003

3

105223

1

105224

1

105225

1

13-10-30 DGL

Picklist Print

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Work Order ID: 108703

108703

Parent Item: D407-667-205

D407-667-205

Parent Item Name: Aft Crosstube

Start Date: 10/29/13

Required Date: 11/12/13

Start Qty: 1.00

Required Qty: 1.00

D2873-043

Manufactured No

230

Each

66.0000

2

2

D2873-043

Nut Plate Assembly

**

AS 13-11-19

Location

Loc Qty

Loc Code

LG052

66

100708

2

103456

1

104871

40

107964

20

72644

2

84386

1

D2873-045

Manufactured No

230

Each

48.0000

2

2

D2873-045

Nut Plate Assembly

**

AS 13-11-19

Location

Loc Qty

Loc Code

LG052

48

100418

1

100707

2

103569

5

104870

40

D2894-1

Manufactured No

230

Each

15.0000

1

1

D2894-1

2.75 Support

**

AS 13-11-14

Location

Loc Qty

Loc Code

LG052

15

103950

9

105623

6

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Page 2

Picklist Print

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Page 3

Work Order ID: 108703

108703

Parent Item: D407-667-205

D407-667-205

Parent Item Name: Aft Crosstube

Start Date: 10/29/13

Required Date: 11/12/13

Start Qty: 1.00

Required Qty: 1.00

D3190-1

Manufactured No

230

Each

55.0000

2

2

D3190-1

Chaffing Shield

**

AL 13-11-14

Location

Loc Qty

Loc Code

LG

12

104822

12

2

LG053

41

100615

1

105834

37

75947

3

LG055

2

72576

2

D3595-063-450

Manufactured No

230

Each

96.7000

2

2

D3595-063-450

Rubber Cushion

**

AL 13-11-14

Location

Loc Qty

Loc Code

FG

15

88422

5

94274

10

LG

3

105054

3

LG050

54

105557

27

106584

27

LG051

24.7

108056

24

99357

0.7

2

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Page 4

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Work Order ID: 108703

108703

Parent Item: D407-667-205

D407-667-205

Parent Item Name: Aft Crosstube

Start Date: 10/29/13

Required Date: 11/12/13

Start Qty: 1.00

Required Qty: 1.00

MS20601-AD4W8

Purchased

No

230

Each

403.0000

14

14

MS20601-AD4W8

RIVET

**

AL 13-11-19

Location

Loc Qty

Loc Code

ST311

377

124102

70

124395

24

M126637

283

ST318

26

M126084

26

15 → 1 scrap

MS21920-22

Purchased

No

230

Each

114.0000

4

4

MS21920-22

Clamp

**

AL 13-11-14

Location

Loc Qty

Loc Code

LG050

114

125487

5

M126420

19

M126637

50

M127255

40

④

MS21920-25

Purchased

No

230

Each

79.0000

2

2

MS21920-25

Clamp

**

AL 13-11-14

Location

Loc Qty

Loc Code

FG

2

120920

2

LG050

77

M126491

37

M126862

40

②

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Shop Packet Print

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Picklist Print

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Page 5

Work Order ID: 108703

Parent Item: D407-667-205

Parent Item Name: Aft Crosstube

108703

D407-667-205

Start Date

11/12/13

v: 1.00

NAS1149D05631

Purchased

No

230

Each

NAS1149D05631

Washer

DAS
6
9-89

Location

Loc Qty

ST294	109
123248	42
123355	12
m125807	55
ST298	91
122452	91
ST510a	4888
m126319	4888

D139-799-017

↑ D416-1
NAS1149C05631

DAS
26
9-89

AN5-10A

Purchased

No

250

Each

AN5-10A

BOLT

DAS
6
9-89

Location

Loc Qty

Loc Code

GA	50
122800	50
st503	303
M126180	303

DSI 9597-11
↑ D416-3

DAS
26
9-89

AN5-32A

Purchased

No

250

Each

AN5-32A

Bolt

DAS
6
9-89

Location

Loc Qty

Loc Code

ST337	266
124215	266
ST350A	5
124805	5

**

10x
4

13-11-21

DAS
26
9-89

October-29-13 8:37:59 AM

Shop Packet Print

Page 5

Picklist Print

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Work Order ID: 108703

Parent Item: D407-667-205

Parent Item Name: Aft Crosstube

108703

D407-667-205

Start Date: 10/29/13

Required Date: 11/12/13

Start Qty: 1.00

Required Qty: 1.00

AN5-34A

Purchased

No

250

Each

62.0000

4

DAS

AN5-34A

**

26

Bolt

9-89

DAS
6
9-89

Location

Loc Qty

Loc Code

st503

62

m126176

46

m126474

16

Purchased

No

250

Each

782.0000

4

**

DAS

MS21042L5

MS21042L5

Nut

26

9-89

DAS
6
9-89

Location

Loc Qty

Loc Code

st507

782

125535

782

4X

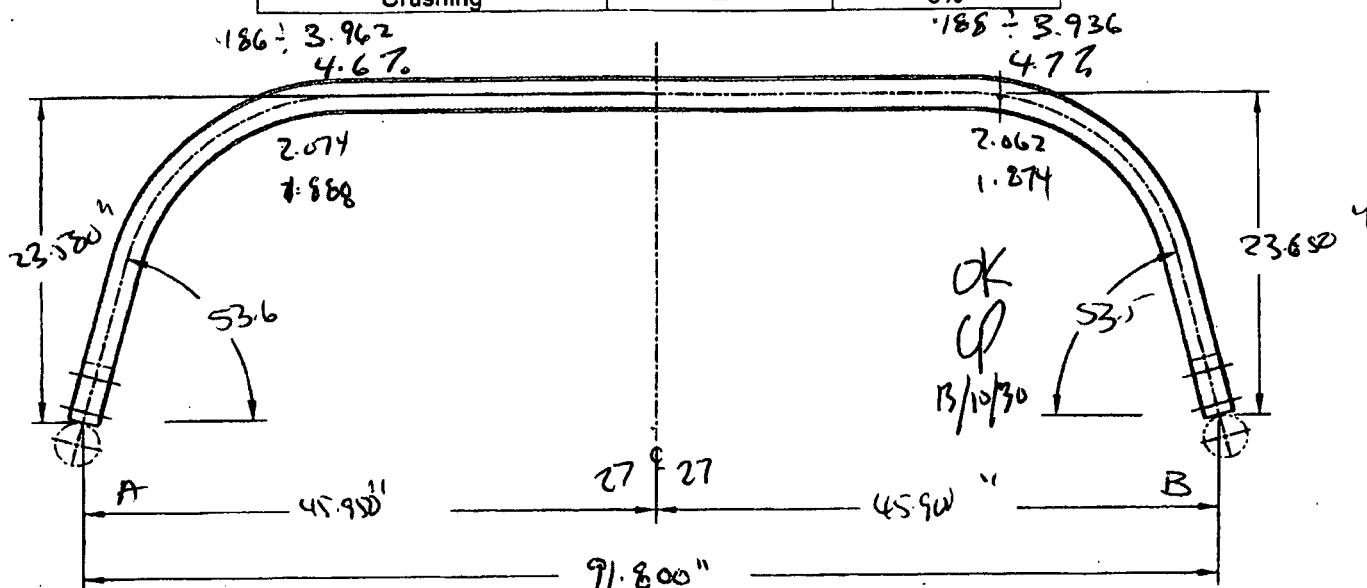
October-29-13 8:37:59 AM

Shop Packet Print

Page 6

DART AEROSPACE LTD	Work Order:	108703
Description: Crosstube High Aft (407)	Part Number:	D407-667-205
Inspection Dwg: D407-667-245	Rev: F	Page 1 of 1

Required Dimension	Min	Max
Height	23.39	23.65
1/2 Span	45.79	46.05
Angle	54	56
Total Span	91.58	92.100
Bending Passes	6	--
Crushing	--	6%



	Side A	Side B
Bending Passes	27	27
Crushing	4.67%	4.77%
Comments		
Side A = 4.67% crush @ 27 Passes		
Side B = 4.77% crush @ 27 Passes		

QC15 Inspection	DAS
Date	16 13/10/31

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	
C	11.08.22	Dimensions updated	KJ	
D	11.09.30	Dimensions updated	KJ	
E	12.04.16	Added bending, crushing dimensions	KJ	

Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D8011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

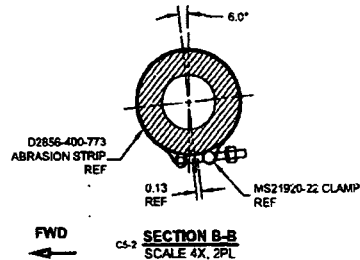
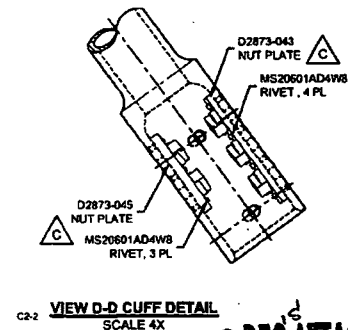
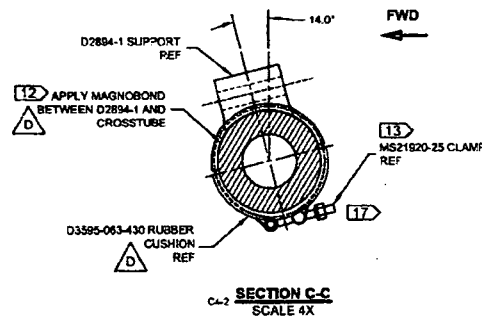
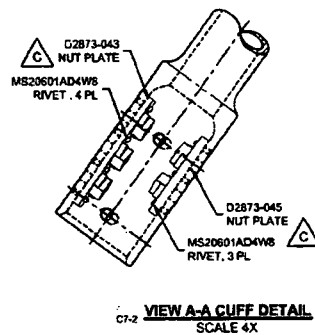
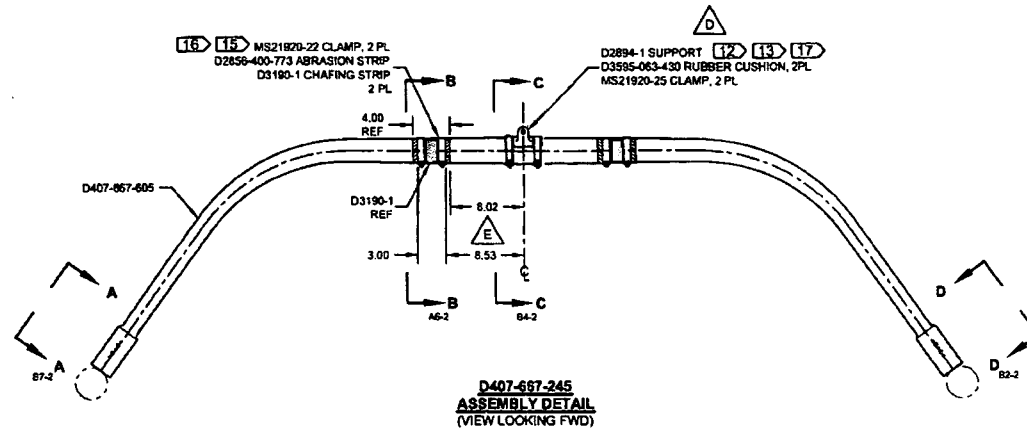
- 1) MATERIAL: MANUFACTURED FROM D8011-115
FINISHED LENGTH = 112.91±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE
SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

108703 MCL
13-10-29 @DEO ATTACHED

RELEASED
08/11/12

F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C8-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PARK8-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -531 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. F
CHECKED	RF	D407-667-245	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE ASSY (407 HIGH AFT)	NTS
DE APPR.	RF	COPYRIGHT © 2003 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT NOT TO BE USED FOR ANY PURPOSES OR COPIED OR REPRODUCED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	08.11.06		

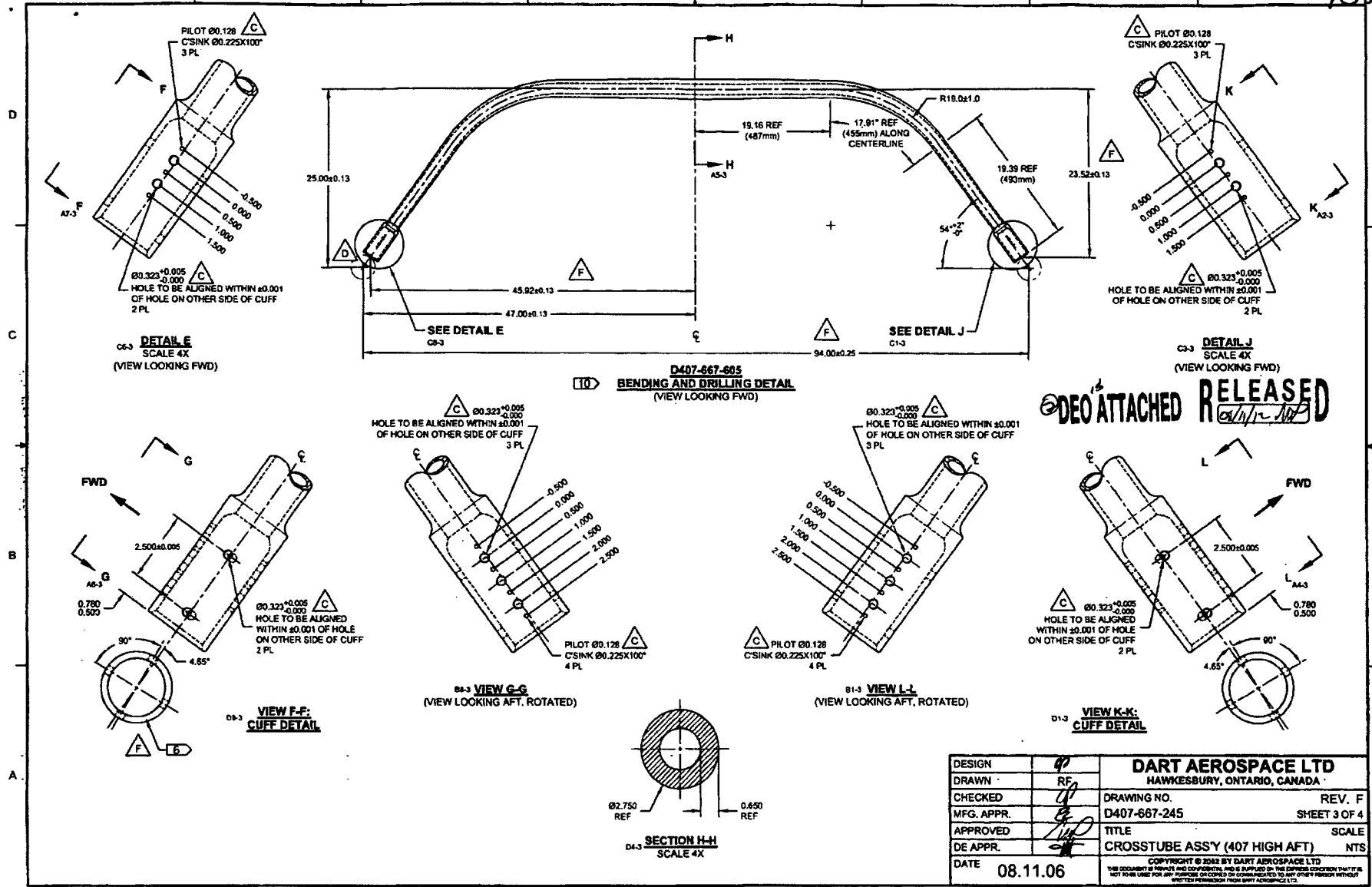
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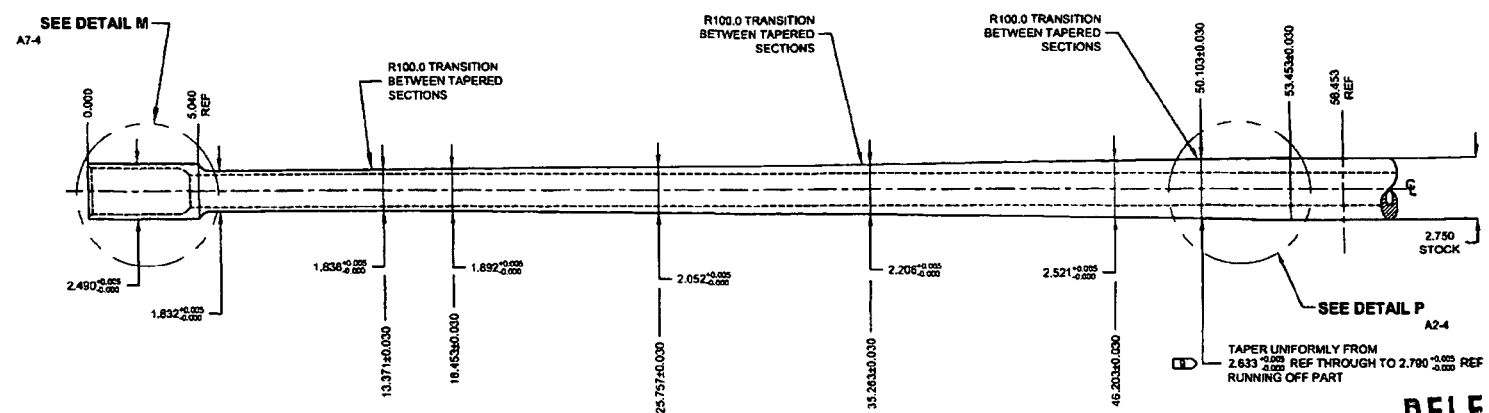
2 DEO ATTACHED
RELEASED

DESIGN	90	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. F
MFG. APPR.	RF	D407-667-245	SHEET 2 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASS'Y (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2003 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY FORM OR BY ANY MEANS WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

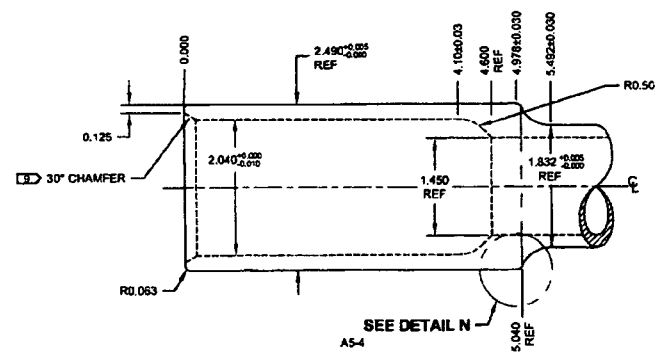
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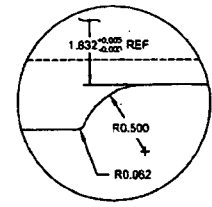
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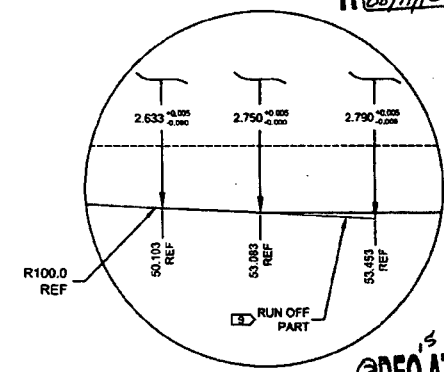
D407-667-245 MACHINING DETAIL



**DETAIL M: CROSSTUBE CUFF
SCALE 3X**



**DETAIL N: CUFF TRANSITION
SCALE 2X**



**DETAIL P: TAPER RUN-OFF
NOT TO SCALE**

RELEASED
08/11/12 JWB

DEO'S ATTACHED

DESIGN	<i>P</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>RF</i>	DRAWING NO.	REV. F
MFG. APPR.		D407-667-245	SHEET 4 OF 4
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	CROSSTUBE ASSY (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIES OR REPRODUCED IN ANY FORM WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

108703

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.			
DATE 11.04.08	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12		

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty	Part Number	Description
	-245		
3	0	D2856-400-773	ABRASION STRIP

WAS:

3	2	D2856-400-773	ABRASION STRIP
---	---	---------------	----------------

NOTES 2 AND 15, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1
CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL
PROSEALED D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT
OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 REF GAP ON BOTTOM SIDE OF
CROSSTUBE PER QSI 035.

RELEASED
2011-04-18

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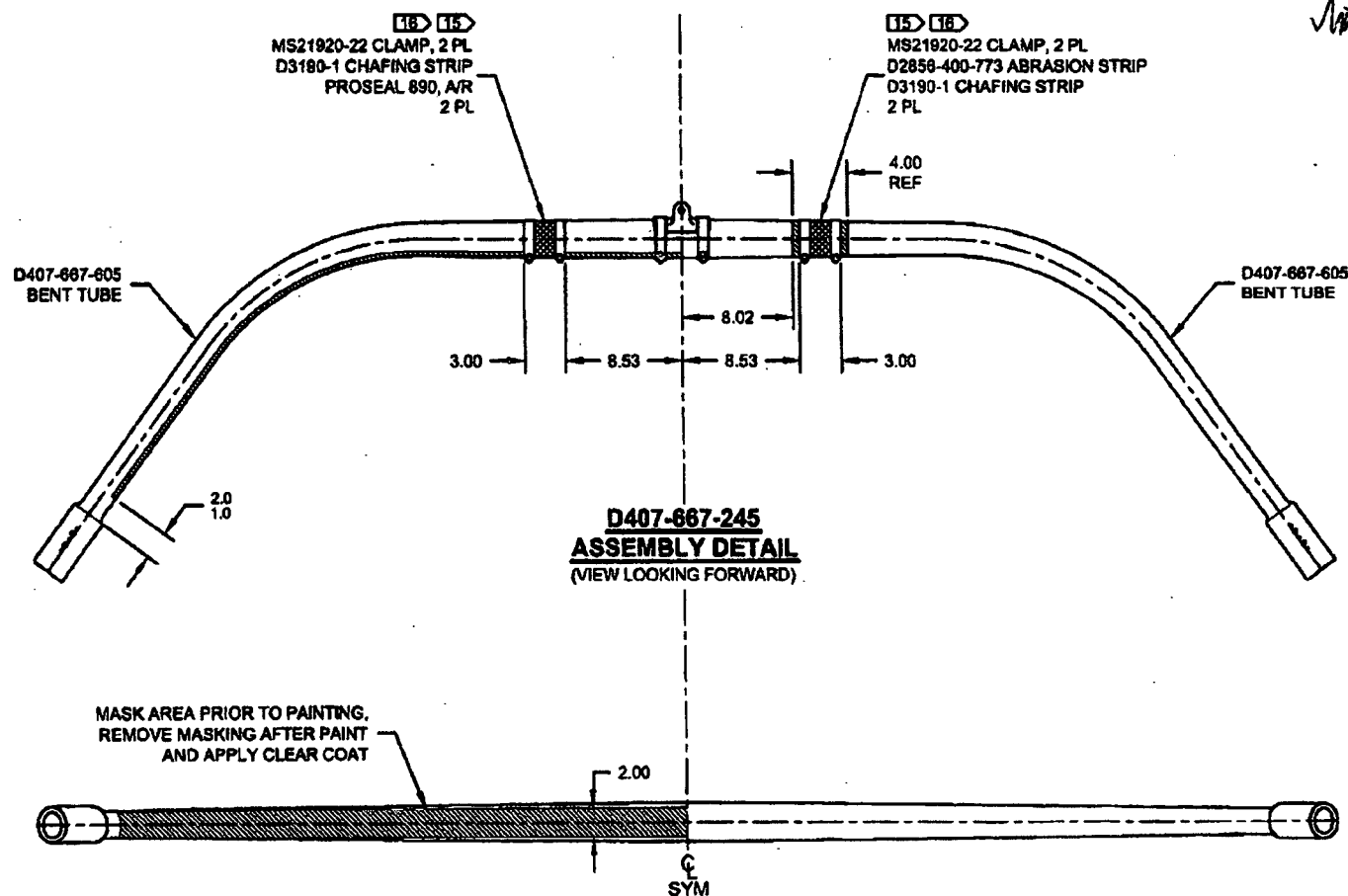
108703

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F.1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>UP</i>	MFG. APPR. <i>RE</i>	APPROVED <i>WP</i>	DE APPR. <i>WP</i>		
DATE 11.04.08	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

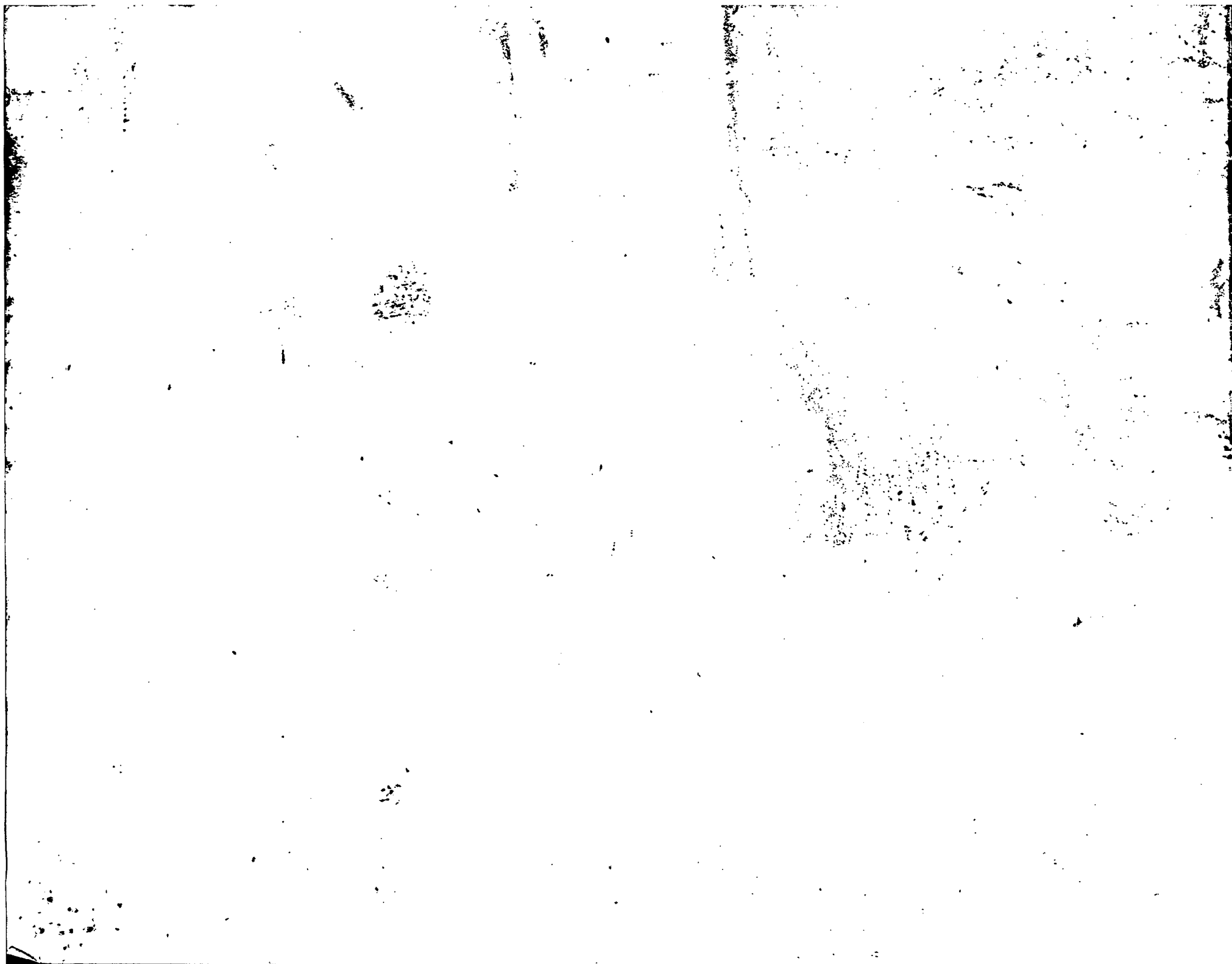
RELEASE
2011-04-10
WP

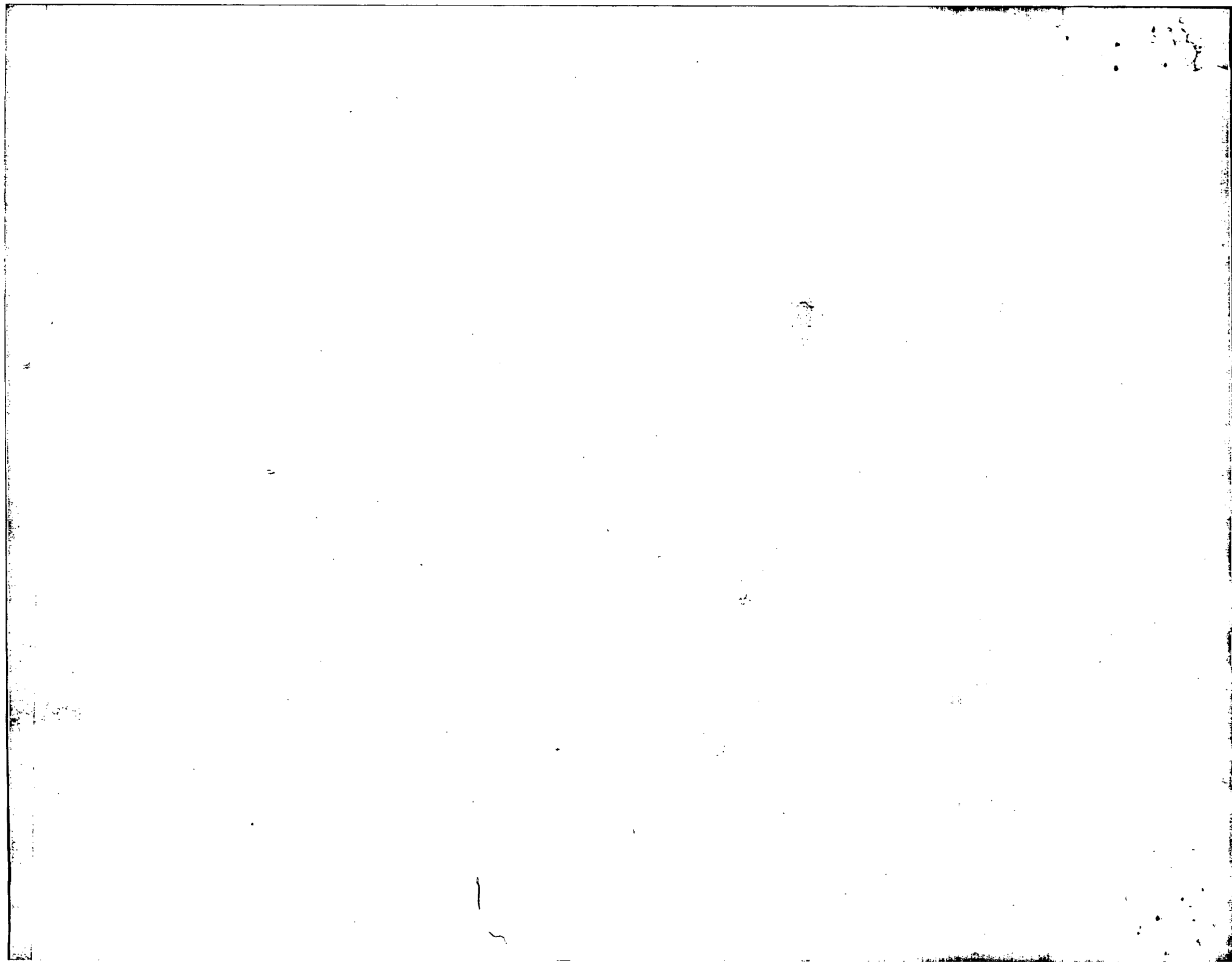
IS:

WAS:



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Work Order ID 104821

July-18-13 1:30:08 PM

104821

Page 1

Item ID: D407-667-205TRN

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Crosstube Turning Detail

Start Date: 7/18/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/01/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MLJ

Date: 13-07-18

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D407-667-245

Rev F

100

0.00

100

MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8531 on both ends as per Folio FA248

2-Turn first side as per Folio FA248

3-Blend transition lines only, **do not sand whole tube**:

FOLIO REV: AA

DWG REV: E

*Use mill bastard file, brush file repeatedly with file card.

*Do not use sandpaper coarser than 320 grit.

1 φ KC
13-7-21

110

QC1- Inspect dimensions to dimension sheet

0.00

110

QC

Memo

0.00

Quality Control

1 φ KC
13-7-21

Work Order ID 104821

July-18-13 1:30:08 PM

104821

Page 2

Item ID: D407-667-205TRN

Accept

N9000040100

Setup Start *NS1*

Revision ID:

Item Name: Crosstube Turning Detail

Stop *NS2*

Start Date: 7/18/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/01/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							
120	MORI SEIKI CNC LATHE LARGE								
Mori Seiki	Memo	0.00							
Mori Seiki CNC Lathe Large	1-Turn second side as per Folio FA248								
	2-Blend transition lines only, **do not sand whole tube**: *Use mill bastard file, brush file repeatedly with file card. *Do not use sandpaper coarser than 320 grit.								
	FOLIO REV: <u>AA</u>								
	DWG REV: <u>E</u>								
	3-Remove sand and plugs								
	4-Scribe part # and batch # using vibrating stylus as per Dwg D407-667-245								
130									
130	QC1- Inspect dimensions to dimension sheet	0.00							
QC	Memo	0.00							
Quality Control									

1 ϕ KC
13-7-21

1 ϕ KC
13-7-21

Work Order ID 104821

July-18-13 1:30:08 PM

104821

Page 3

Item ID: D407-667-205TRN

Accept

N900040100

Setup Start *NS1*

Revision ID:

Item Name: Crosstube Turning Detail

Stop *NS2*

Start Date: 7/18/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/01/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	QC8- Inspect parts - second check	0.00							
140									
QC	Memo	0.00							
Quality Control									
145		0.00							
145									
Crosstubes	Memo	0.00							
Crosstubes	Grind off circumferential machining marks longitudinally.								
150		0.00							
150									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	1- PRESSURE WASH X-TUBE INSIDE AND OUT								
	2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE								

TH 13-07-22

Rm 13-07-22

Rm/AB 13-07-22

Work Order ID 104821

July-18-13 1:30:08 PM

104821

Page 4

Item ID: D407-667-205TRN

Accept

N9000040100

Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Turning Detail

Stop ***NS2***

Start Date: 7/18/13 Start Qty: 1.00

1

Cust Item ID:

Required Date: 8/01/13 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160	QCS- Inspect part completeness to step on W/O	0.00							
160									
QC	Memo	0.00				1			DAS 05 2-89 13-07-25
Quality Control									
170	Packaging	0.00							
170									
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rackLocation: <u>LG</u>								<u>13-07-25</u>
180	QC21- Final Inspection - Work Order Release	0.00							
180									
QC	Memo	0.00							
Quality Control									<u>ML5 13-07-30</u>

ML5 13-07-29

Picklist Print

July-18-13 1:30:11 PM

Page 1

Work Order ID: 104821

104821

Parent Item: D407-667-205TRN

D407-667-205TRN

Parent Item Name: Crosstube Turning Detail

Start Date: 7/18/13

Required Date: 8/01/13

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A 08-03-06 new issue DD verified by:ec
 IPP Rev B 08.04.02 Removed polish EC verified by: DD
 IPP Rev:C 08-08-19 revE as per dwg DD verified by:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6011-115		Manufactured	No			120	Each	40.0000	1	1			

D6011-115

Crosstube Material

**

Location

Loc Qty

Loc Code

LG015

40

67798

12

69802

5

75639

23

1 mm. L 13/07/14

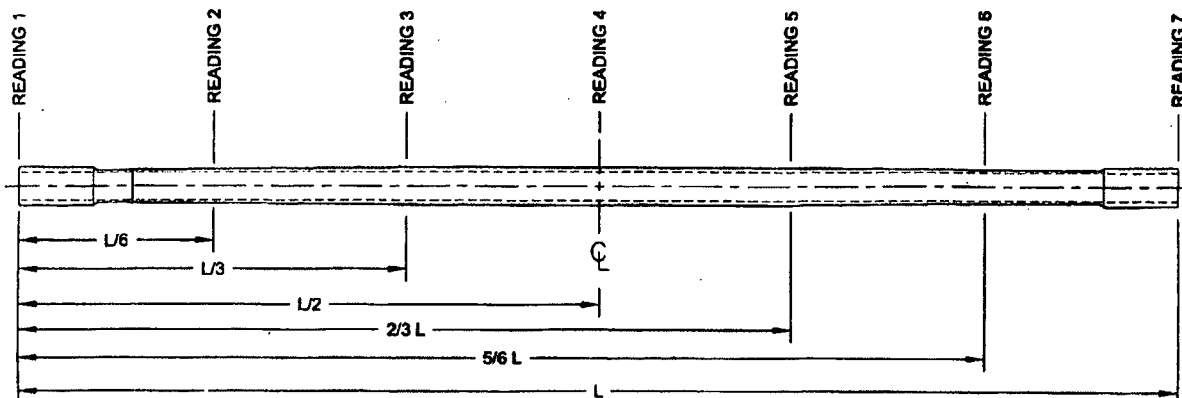
DART AEROSPACE LTD		Work Order:	104821
Description: Crosstube Assembly		Part Number:	D407-667-245
Inspection Dwg: D407-667-245 Rev: F		Page 1 of 2	

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.490	+0.005/-0.000	2.492	/		VERN	CNC-08
	1.832	+0.005/-0.000	1.836	/			
	1.838	+0.005/-0.000	1.841	/			
	1.892	+0.005/-0.000	1.896	/			
	2.052	+0.005/-0.000	2.056	/			
	2.206	+0.005/-0.000	2.211	/			
	2.521	+0.005/-0.000	2.526	/			
	2.633	+0.005/-0.000	2.637	/			
	4.10	+/-0.030	4.10	/			
	4.978	+/-0.030	4.988	/			
	2.040	+0.000/-0.010	2.036	/			
	0.125	+/-0.010	.125	/			
	R0.063	+/-0.010	.063	/		RG	
	R0.500	+/-0.010	.500	/		RG	
SIDE B	2.490	+0.005/-0.000	2.492	/		VERN	CNC-08
	1.832	+0.005/-0.000	1.836	/			
	1.838	+0.005/-0.000	1.840	/			
	1.892	+0.005/-0.000	1.895	/			
	2.052	+0.005/-0.000	2.053	/			
	2.206	+0.005/-0.000	2.209	/			
	2.521	+0.005/-0.000	2.525	/			
	2.633	+0.005/-0.000	2.636	/			
	4.10	+/-0.030	4.10	/			
	4.978	+/-0.030	4.985	/			
	2.040	+0.000/-0.010	2.034	/			
	0.125	+/-0.010	.135	/			
	R0.063	+/-0.010	.063	/		RG	
	R0.500	+/-0.010	.500	/		RG	
	112.91	+/-0.020	112.91	/		TAPE	LG-15

DART AEROSPACE LTD	Work Order: 104821
Description: Crosstube Assembly	Part Number: D407-667-245
Inspection Dwg: D407-667-245 Rev: F	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	238	233	239	239	.006	0.075"
READING 2 L= 18.818	232	218	269	285	.067	
READING 3 L= 37.63	403	409	433	438	.029	
READING 4 L= 56.455	647	643	664	670	.027	
READING 5 L= 75.27	414	410	421	434	.024	
READING 6 L= 94.09	252	249	242	247	.010	
READING 7 L= 112.91	238	238	232	238	.006	

Top | Bottom

0.409 0.428
0.635 0.664
0.396 0.437

Calibration Result

Actual Block Thickness: 100-750

Sitescan 250 Measured Thickness: 100-750

Measured by: KC	Audited by: JW	Preliminary Approval:
Date: 13-7-21	Date: 13-07-22	Date:

Rev	Date	Change	Revised by	Approved
A	04.04.21	New Issue (P/O D407-667-205)	KJ/RF	
B	06.03.09	Dwg Rev updated	KJ/JLM	
C	06.03.30	Tolerance revised for 4.978 dimension	KJ/JLM	
D	07.02.19	Dwg Rev updated	KJ/JLM	
E	09.05.20	Dwg Rev updated	KJ	
F	12.06.04	Wall thickness form added	KJ	

Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6011-115
FINISHED LENGTH = 112.81±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER 'D407-667-245' AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS. ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE. PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

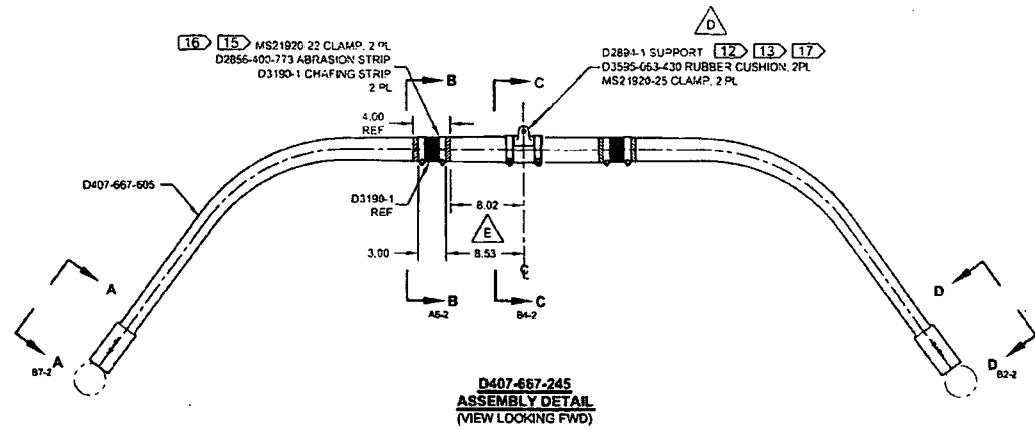
SHOP COPY
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UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 104821 MCT
13-07-18

2 DEO ATTACHED

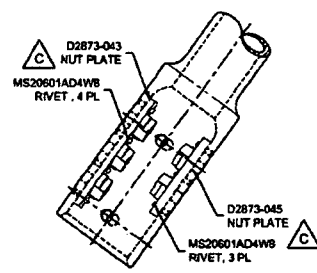
RELEASED
08/11/12 N/A

F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1): RELOCATED FLAG # 6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.08
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PARKS-21 AND EGM1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	RF	DRAWING NO.	REV. F
MFG. APPR.	RF	D407-667-245	SHEET 1 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASSY (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PROPRIETARY AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD.	

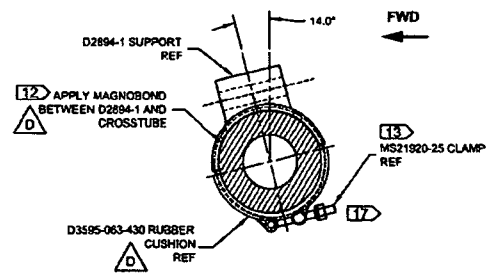
704821



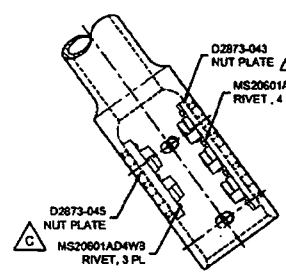
**D407-667-245
ASSEMBLY DETAIL
(VIEW LOOKING FWD)**



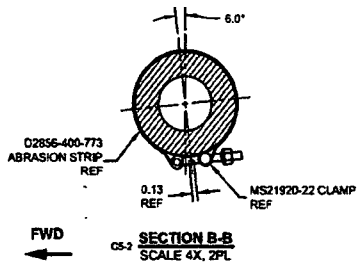
**VIEW A-A CUFF DETAIL
SCALE 4X**



**SECTION C-C
SCALE 4X**



**VIEW D-D CUFF DETAIL
SCALE 4X**



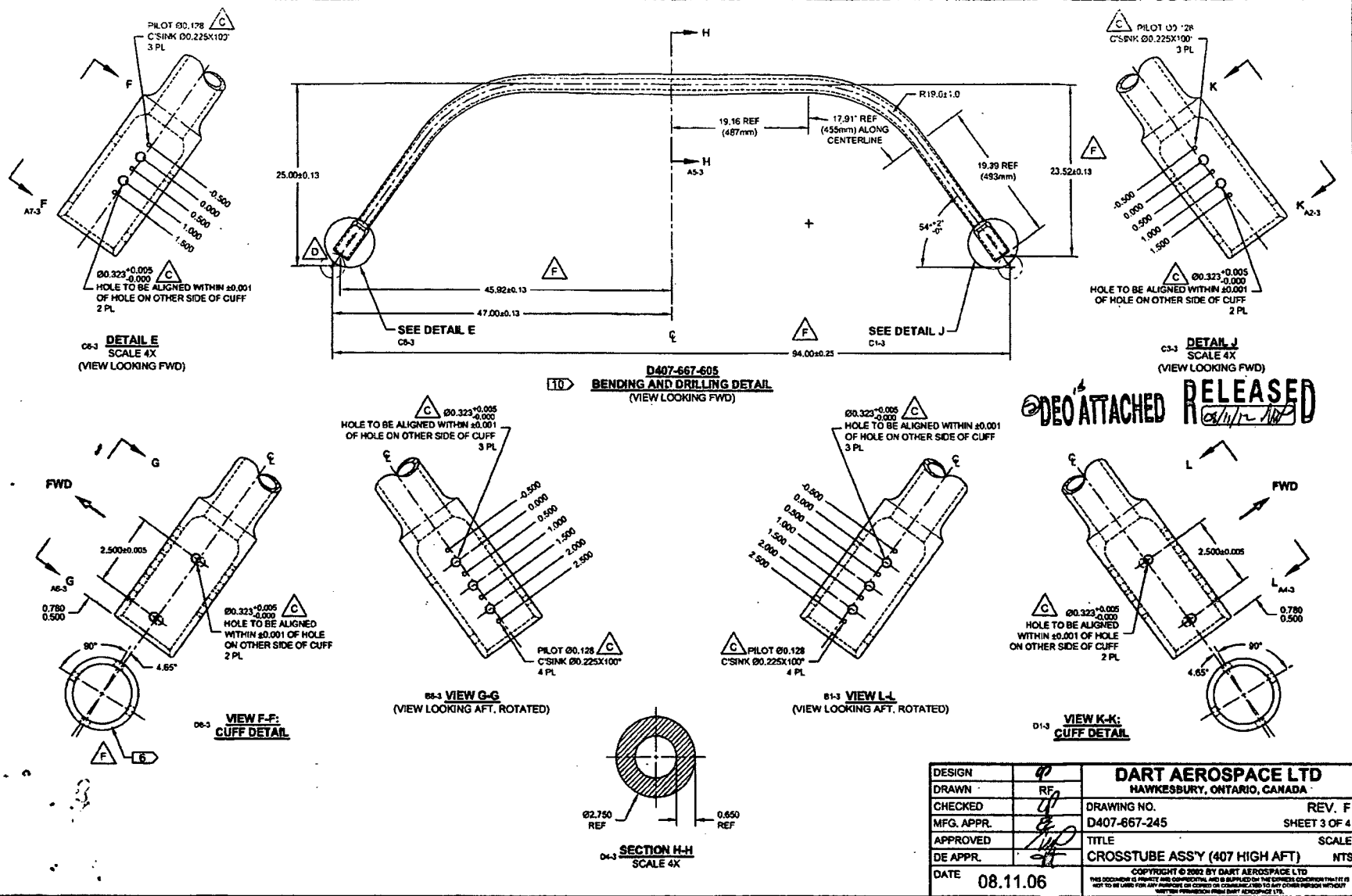
**SECTION B-B
SCALE 4X, 2PL**

**DEO ATTACHED
RELEASED**

DESIGN	40	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	4	DRAWING NO. REV. F
MFG. APPR.	4	D407-667-245 SHEET 2 OF 4
APPROVED	4	TITLE SCALE
DE APPR.	4	CROSSTUBE ASSY (407 HIGH AFT) NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD

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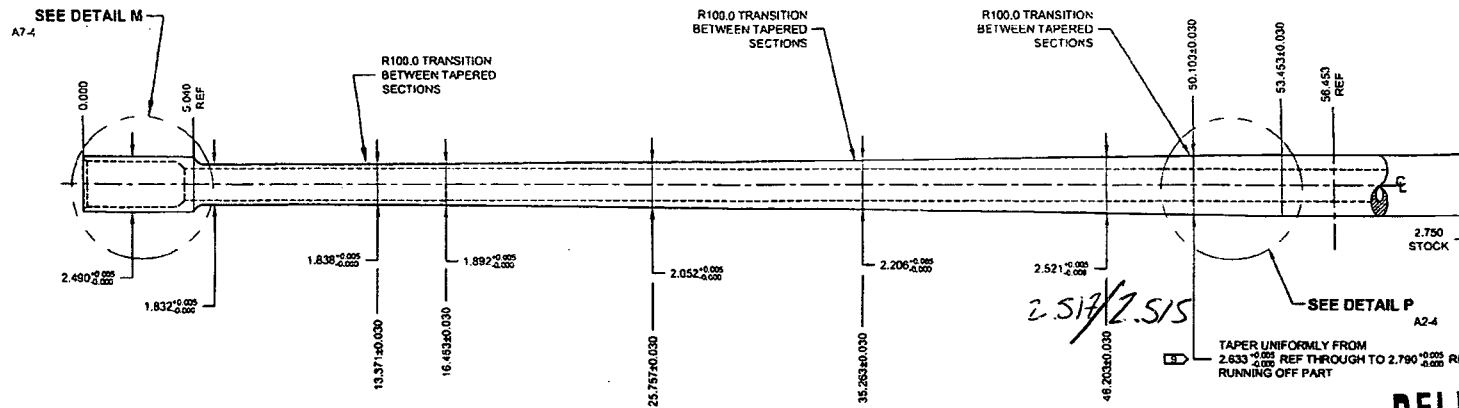
104821



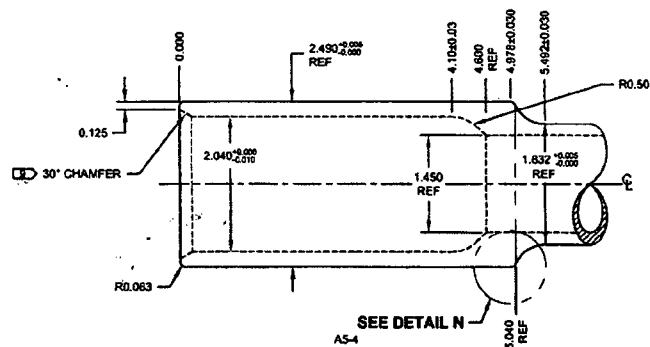
DESIGN	90	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	Y	DRAWING NO. REV. F
MFG. APPR.	E	D407-667-245 SHEET 3 OF 4
APPROVED	H	TITLE SCALE
DE APPR.	H	CROSSTUBE ASSY (407 HIGH AFT) NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD

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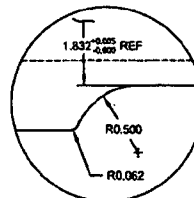
104821



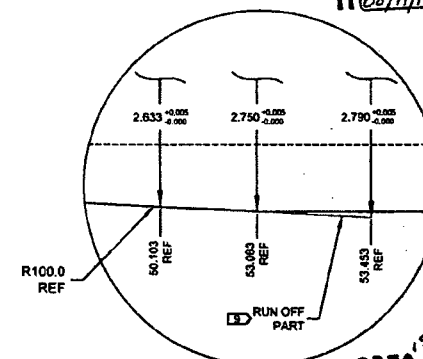
D407-667-245 MACHINING DETAIL



**DETAIL M: CROSSTUBE CUFF
SCALE 3X**



**DETAIL N: CUFF TRANSITION
SCALE 2X**



**DETAIL P: TAPER RUN-OFF
NOT TO SCALE**

RELEASED
08/11/12 JHP

DEO ATTACHED

DESIGN	DP	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DP	DRAWING NO.	REV. F
MFG. APPR.	DP	D407-667-245	SHEET 4 OF 4
APPROVED	DP	TITLE	SCALE
DE APPR.	DP	CROSSTUBE ASSY (407 HIGH AFT)	NTS
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104821

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED	MFG. APPR.	APPROVED	DE APPR.			
DATE 11.04.08	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12		

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty -245	Part Number	Description
3	0	D2856-400-773	ABRASION STRIP

WAS:

3	2	D2856-400-773	ABRASION STRIP
---	---	---------------	----------------

NOTES 2 AND 15, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
PAINT OUTSIDE PER DART QSI 005 4.2
REMOVE MASKING AND APPLY CLEAR COAT
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1
CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL
PROSEAL D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT
OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 REF GAP ON BOTTOM SIDE OF
CROSSTUBE PER QSI 035.

RELEASED
2011-04-18

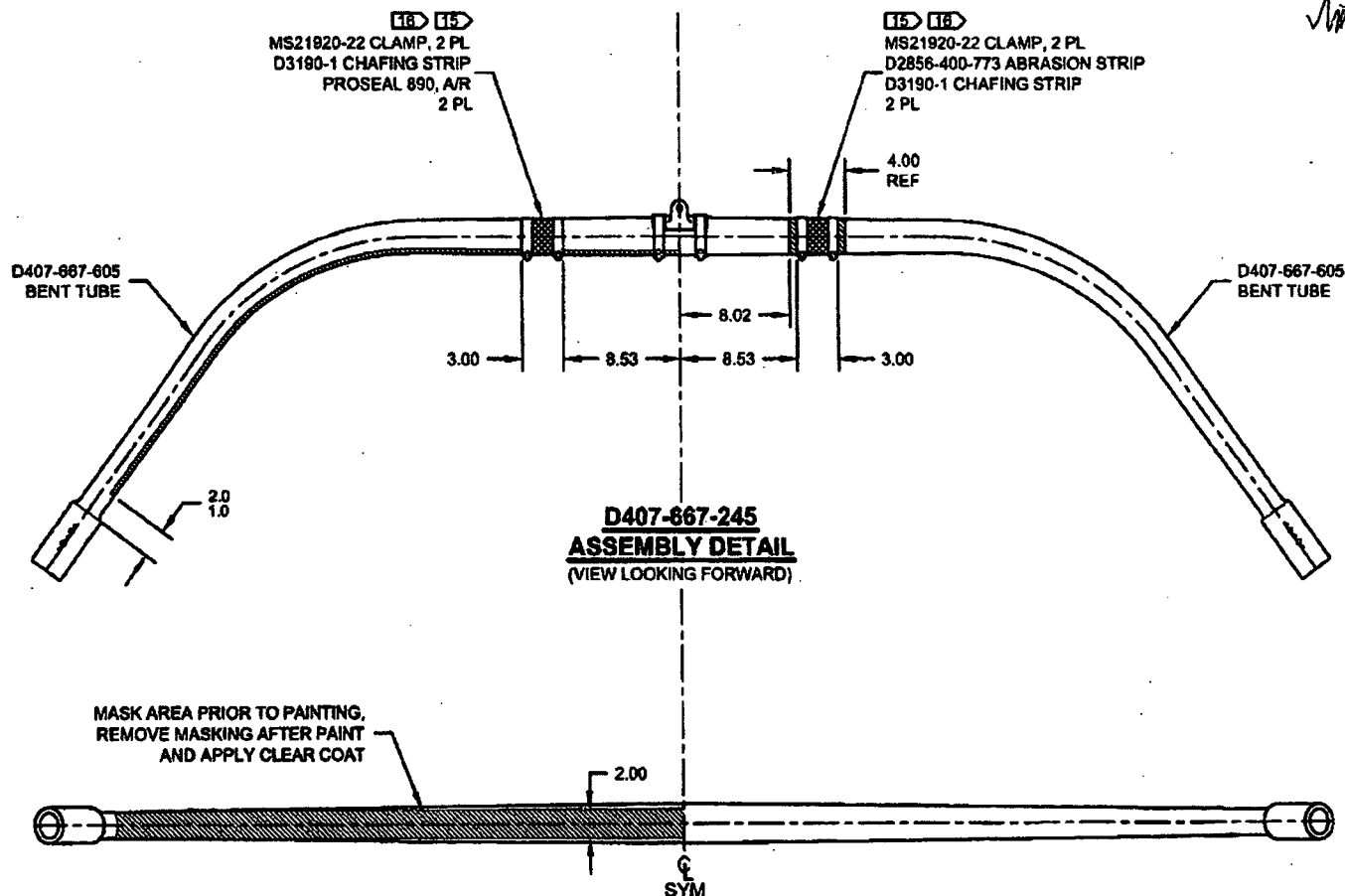
107821

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>UP</i>	MFG. APPR. <i>E</i>	APPROVED <i>W</i>	DE APPR. <i>H</i>		
DATE 11.04.08	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

IS:

WAS:

RELEASED
2011-04-10
W



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DART
AEROSPACE LTD

104821

TITLE CROSSTUBE ASS'Y (407 HIGH AFT)		REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
9.07	CHECKED ASS	MFG. APPR. E	APPROVED MP	DE APPR. TH	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19

PURPOSE:
REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

Item	Qty	Part Number	Description
12	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
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NOTE 12 & 17, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-09-29
MP

DQA:

Date:

16/01/15

QA Closed:

Date:

15/12/14

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order update only ☐

Work Order: <u>135863</u> Part No: <u>D407-667-205</u> NCR No: <u>5-558 repair</u>	DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td style="width:15%;">Skid-tube ☐</td> <td style="width:15%;">Cross tube ☒</td> <td style="width:15%;">Water Jet ☐</td> <td style="width:15%;">Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>			Skid-tube ☐	Cross tube ☒	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Cross tube ☒	Water Jet ☐	Engineering ☐																	
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐																	
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐																	
Large Fab ☐	Composite ☐	Supplier ☐																		
Date: <u>15/10/17</u>	Step #: <u>100</u>	QTY Effective: <u>①</u>	MRB (QSI042) Approval DAS 12 9-89 15/10/17																	
Description Work Order Deviation Acceptable to put a bead of protect 890 around support and chafing shield.		Disposition Acceptable, minor deviation																		
Root Cause <table style="width:100%;"> <tr> <td style="width:50%;"> Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ </td> <td style="width:50%;"> No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☒ Manufacturing Process ☐ Past Due ☐ </td> </tr> </table>		Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☒ Manufacturing Process ☐ Past Due ☐	FAULT CATEGORY <table style="width:100%;"> <tr> <td style="width:33%;"> Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ </td> <td style="width:33%;"> Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ </td> <td style="width:33%;"> Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☒ Misaligned/off center ☐ </td> <td style="width:33%;"> Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐ </td> </tr> </table>		Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☒ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐											
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